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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/807,714	03/19/2004	Yuanping Chen	ARL 03-83	4402

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EXAMINER	
QUACH, TUAN N	
ART UNIT	**PAPER NUMBER**
2826	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	04/05/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/807,714	CHEN ET AL.	
	Examiner	Art Unit	
	Tuan Quach	2826	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *4/28/06*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-68* is/are pending in the application.

4a) Of the above claim(s) *35-68* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-34* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *19 March 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

HM

Tuan Quach
Primary Examiner

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

For convenient referencing, et al. is omitted.

Claims 1-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rajavel in view of Han and Mitra of record.

Re claims 1, 2, 21, Rajavel 5,742,089 teaches multilayer structure comprising a silicon based substrate 14, epitaxial layer 18 including II-VI semiconductor material including combination of two binary alloys such as CdSe/ZnTe but lacks the specific recitation regarding the composition, e.g., of $Cd_{1-z}Zn_zSe_xTe_{1-x}$. The provision of overlayer 20, e.g., HgCdTe is also taught. See column 3 line 45 to column 8 line 65.

Han 7,056,471 B1 teaches homogeneous II-VI quarternary alloys M1-xM2xAyB1-y having improved characteristics and easy to produce, including the specific recitation of $Zn_{1-x}Cd_xSe_yTe_{1-y}$. The selection of the indices to be between zero and 1 is also taught. See the abstract, column 1 line 5 et seq., column 3 line 60 et seq., column 4 line 4 to column 9 line 65.

It would have been obvious to one skilled in the art in practicing the above invention to have selected the quarternary compounds as claimed since such quarternary compounds are conventional, advantageous, and easy to produce as

evidenced by Han. It would have been obvious and would have been within the purview of one skilled in the art to have selected the appropriate values of the indices x and z, given the teachings of Han evidencing the overlapping range. Additionally, such variation would have been further obvious and advantageous as evidenced by Mitra, 6,208,005, column 5 line 60-65 wherein the variation of the alloy composition would have been conventional and obvious to obtain the desired film characteristics, e.g., desired bandgap. Re claims 3, 16, 28, the use of z being zero corresponds to the omission or minimization of Zn, such would have been obvious when x in Han is maximized and as shown in Rajavel, column 4 lines 14-15 when CdSe and CdTe are employed as the binary compounds thus obviating Zn. It is well settled that In the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a prima facie case of obviousness exists. In re Wertheim, 541 F.2d 257, 191 USPQ 90 (CCPA 1976); In re Woodruff, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir. 1990) (The prior art taught carbon monoxide concentrations of "about 1-5%" while the claim was limited to "more than 5%." The court held that "about 1-5%" allowed for concentrations slightly above 5% thus the ranges overlapped.); In re Geisler, 116 F.3d 1465, 1469-71, 43 USPQ2d 1362, 1365-66 (Fed. Cir. 1997). A prima facie case of obviousness exists where the claimed ranges and prior art ranges do not overlap but are close enough that one skilled in the art would have expected them to have the same properties. Titanium Metals Corp. of America v. Banner, 778 F.2d 775, 227 USPQ 773 (Fed. Cir. 1985) "[A] prior art reference that discloses a range encompassing a somewhat narrower claimed range is sufficient to establish a prima facie case of obviousness." In re Peterson, 315

F.3d 1325, 1330, 65 USPQ2d 1379, 1382-83 (Fed. Cir. 2003). A range can be disclosed in multiple prior art references instead of in a single prior art reference depending on the specific facts of the case. Iron Grip Barbell Co., Inc. v. USA Sports, Inc., 392 F.3d 1317, 1322, 73 USPQ2d 1225, 1228 (Fed. Cir. 2004). The normal desire of scientists or artisans to improve upon what is already generally known provides the motivation to determine where in a disclosed set of percentage ranges is the optimum combination of percentages."); In re Hoeschele, 406 F.2d 1403, 160 USPQ 809 (CCPA 1969).

Re claim 4, the use of an overlayer of CdX' corresponds to passvating layer 16 including Cd and Se or Te as shown in Rajavel, column 4 lines 1-5. Re claim 6, the use of single crystal silicon substrate is well known in the art and is encompassed in Rajavel and as such would have been obvious. Re claims 6-10, 15-18, 22, 26, 29, 33, such selection would have been obvious and would have been encompassed or overlapped in the range taught in Han as delineated above and in view of the optimization as suggested by Mitra above; it is well settled that in the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a prima facie case of obviousness exists. In re Wertheim, 541 F.2d 257, 191 USPQ 90 (CCPA 1976); In re Woodruff, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir. 1990). Re claims 11-12, 23, 24, 30, and claims depending therefrom, concerning the surface defect density, the Office is not equipped to measure the surface defect density in question, such would be inherent in or unpatentable over the prior art above, absent evidence to the contrary as the same layer or substantially similar material is obtained; it is well settled that once the

claimed product appears to be the same or similar to that of the prior art, although produced by a different process, the burden shifts to applicant to come forward with evidence establishing an unobvious difference between the claimed product and the prior art product. Re claims 13-14, 19, 20, 24, 25, 31, 32, and claims depending therefrom, the recitation of the overlayer such as cadmium chalcogenide $Hg_{1-y}Cd_yTe$ overlayer is also taught in Rajavel supra, layer 20/22, column 4 lines 25-58. Re claims 27 and 34, these correspond to product-by-process feature and are deemed to be unpatentable over the prior art; it is well settled that for a product-by-process it is the patentability of the product which must be determined. "[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." In re Thorpe, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985) (citations omitted). Alternatively, such source for deposition is well known in the art and as such would have been obvious.

Applicant's arguments filed January 16, 2007 have been fully considered but they are not persuasive.

Initially, it is noted that the Preliminary Amendment filed 27 May 2004 had been received and entered; claims 17, 28, 29-34 had been examined as amended therein. The Chen et al. article has been received and considered and made of record in attached PTO-892.

Applicant argues that no one skilled in the art would practice the Rajavel process due to its lack of lattice matching and because of phase separation. Nonetheless, this fails to consider the desired characteristics taught in Rajavel, including low dislocation density, excellent lattice matching. See the abstract, column 3 lines 24-25.

Applicant argues that Han does not teach how to form the quarternary alloys on a silicon substrate. This fails to consider however the teachings of Rajavel 5,742,089 which teaches multilayer structure comprising a silicon based substrate 14, epitaxial layer 18 thus including II-VI semiconductor material including combination of two binary alloys such as CdSe/ZnTe.

Applicant argues that Mitra is drawn to mercury based quarternary alloys. This fails to consider however that Mitra is not limited to mercury based quartenary alloys, see the various materials taught in Mitra, e.g, the abstract, column 3 lines 30-32, column 5 lines 60-65.

In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988)and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, one skilled in the art would have found it obvious to have selected the quarternary compounds as claimed since such quarternary compounds are conventional, advantageous, and easy to

produce as evidenced by Han and wherein the selection of appropriate values of the indices x and z, would have been obvious given the teachings of Han evidencing the overlapping range. Additionally, such variation would have been further obvious and advantageous as evidenced by Mitra, 6,208,005, column 5 line 60-65 wherein the variation of the alloy composition would have been conventional and obvious to obtain the desired film characteristics, e.g., desired bandgap.

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to examiner Tuan Quach whose telephone number is 571-272-1717. The examiner can normally be reached on M-F from 8:30 AM to 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor Sue Purvis can be reached on 571-272-1236. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Tuan Quach
Primary Examiner